LEPIDOPTERA OF A BAGDAD ORCHARD.

By E. P. Wiltshire, F.R.E.S.

It has already been remarked (1) that the fauna of Iraq can be subdivided into that of several distinct areas:—

1. The Sea-Coast and mud flats.
2. The Syrian-Arabian desert's high ground (this area merges into area No. 9 in Upper Iraq).
3. Marsh-land.
4. Date and fruit gardens.
5. Corn lands.
6. Rivers.
7. Unirrigated alluvial mud desert.
8. Towns and buildings.
9. Upland desert and foothills.

There are, of course, many species of insects common to two or more of these divisions, and a few common to all, but in general it can be safely said that each is characterised by its own peculiar inhabitants. In places there is an overlapping or lack of distinction between two divisions: for instance, area No. 4 may fuse with area No. 8, and area No. 3 with No. 7, especially in the south of Iraq, but there is an overlapping, more or less, between all faunistic zones or divisions that the mind of man may care to make, just as there are often transitional forms between the subspecies which entomologists have described with such pains in recent years. This confusion, therefore, does not invalidate the distinction made.

The previously published lepidopterous fauna of Iraq (2) fails, in the main, to observe these distinctions for the simple reason that the authors (Rothschild and Prout) were unacquainted with the country and were only able to study a collection of tersely-labelled moths. An exception must be made of the Section on Butterflies, by Peile, whose energetic and observant field-work gives a special value to his contribution (3), in which he pays careful attention to the kind of ground on which he observed the various butterflies. For this reason the present paper, which deals with the fourth division in the above list of areas, omits all mention of Rhopalocera, and also for the reason, noted by Peile, of the extreme paucity of butterflies in the district under consideration.

Two years' residence in Iraq has enabled me to add many species to the Bombay list and, in bringing them to the notice of the public, I shall endeavour at the same time to indicate to which of the above divisions each is attached. I choose to do this by treating each division separately, except where two may be too closely related to permit such treatment. In preparation are two papers, one dealing with divisions

1 P. A. Buxton and R. E. Cheesman, "Birds of Mesopotamia" (Claude Ticehurst), *Journ. Bombay N.H.S.*, December 30, 1920.

2 "Moths of Mesopotamia and N.W. Persia," by various authors, *Journ. Bombay N.H.S.*, December 30, 1921.

3 "Butterflies of Mesopotamia," by H. D. Peile, F.E.S. (*Journ. Bombay N.H.S.*, December 30, 1921, and March 25, 1922).

Nos. 7 and 9, and concentrating on the *Agrotidae* (*sensu lato*), entitled "The Saharan and other Affinities of the Mesopotamian Desert Fauna," and the other, concerned with No. 6, entitled "A Biological Study of a Tigris Island." Both of these are bigger, and take longer to prepare, than the present study, which, therefore, appears first.

In considering the whole fauna of the Kingdom of Iraq, a tenth faunal area must be added to the above list:—

10. The Kurdish mountains (including the northern section of the Zagros range).

This division forms the subject of my papers on the Rowanduz district (4).

The Bagdad orchard which I studied is probably the same as that described by Hingston, whose fascinating book (5), in the manner of Fabre, deals with certain of its Hymenoptera and Arachnida. It lies to the south of the city, near Karradah, and is known to Britishers as "Devonshire," on account of the prettiness of the almond, apricot, and apple blossom in the spring. Other crops are dates, wheat, mulberry, fig and beans. Among the old fruit trees the low vegetation is allowed to run wild. One even sees hawthorn bushes and gets caught in bramble and briar as one pushes into the shady greenery. There is less vegetation under the palms, but even here grass and many low plants grow, protected by the shade of the palms and drinking their water. Often orange-trees are planted. Wheat and beans grow in the more open spaces between the denser palm-groves. All of these crops and vegetation are entirely dependent on water raised from the Tigris by oil-driven pumps. Some of the insects to be found in the luxuriant depths of these orchards can also be found in less shady places and some are even also residents of the unrelieved desert. But others (class A, below) are not found outside this limited breeding-ground: either in the irrigated cornfields that in places grow on treeless parts of the plain, or among the jungle of the river's banks and islands, and of course, not in the absolute desert. These latter insects are like the inhabitants of an island; they are cut off from their original centre of distribution, and if they wander afield they cannot propagate their kind. In the immediate vicinity of Bagdad there is a fairly continuous series of similar orchards, either on one side of the Tigris or the other, but this fertile strip or "oasis" is by no means continuous all along the river's length. Between the hills of Kurdistan and Bagdad are vast expanses of unrelieved desert where no such wealth of humid vegetation grows and below Bagdad are similar stretches, where unirrigated land or treeless cornfields would prevent these species from now extending their range to similar gardens further south, or reinforcing brother-colonies already established there. Yet, in origin, the majority of these species hail from the North. It is unbelievable that they should have arrived at these gardens by flying over the inhospitable desert where they cannot live. Trans-desert insect-migrations in Iraq are, in my experience and opinion, invariably northwards or westwards and seem to provide a safety-valve to prolific species which find themselves

4 "Autumnal Lepidoptera in Kurdistan," *Ent. Rec.*, 31.VIII.37 and 21.IX.37, and "More Notes on Kurdish Lepidoptera" (ined.).

5 "Nature at the Desert's Edge," by R. W. G. Hingston, Witherby (London), 1925.

overcrowded in early summer on a progressively hotter and drier breeding-ground. But these species would have to have flown south-eastwards, with no such biological urge, to arrive here. One is driven to the conclusion, therefore, that they are the isolated survivors of a fauna which, in the days of Mesopotamia's greatest extent of irrigation (Assyrian-Babylonian-Seleucian-Sasanian-Islamic until the Mongol invasion), had drifted southwards from the mountains of Turkey, Armenia and Persia along uninterrupted strips of favourable ground on either side of the main rivers of the country.

Only, if it should be proved that Mesopotamian irrigation goes back to the last Ice Age, could we suppose that these species are the descendants of colonists who arrived here without human aid; for with the retreat of the Ice Cap from Europe began the desiccation of these regions, and any of these species that may have established themselves here during the Pluvial Period, which here corresponded to Europe's Ice Age, must have been exterminated by an interval between that period and the first appearance of irrigated gardens in Mesopotamia.* If such an interval occurred, as seems probable, the species peculiar to the " Devonshire " orchards are mere cultivation-followers in Iraq, with the possible exception of *C. polygrammata*, which may perhaps have survived this interval in the marshes. And their position is precarious, for should this cultivation ever become organised in a modern, scientific fashion, i.e., if the orchards were thoroughly tidied up and weeded and cleaned, most of them would be again exterminated. Their existence in Iraq depends on human culture, but it must be rural, primitive culture.

Those species below whose names are followed by (N) are here recorded for the first time from the plains of Iraq. (I include the upland plains around Mosul in the expression " plains of Iraq.")

A. PURELY ORCHARD SPECIES.

The following are the species which I have found nowhere else in the plains of Iraq than in the shadiest orchards (Division 4):—

Euxoa temera, Hbn. (N); *Rhyacia xanthographa*, Schiff. (N); *Polia oleracea*, L. (N); *Cirphis congrua*, Hbn. (N); *Sideridis ? putrescens*, Hbn.-G. (N); *Cidaria polygrammata*, Bkh. (N); *Nychiodes ? divergaria*, Stgr. (N); *Sterrha textaria*, Led. (N); *Ethmia pusiella*, Roemer. (N); *Trichophaga abruptella*, Walk. (N); *Oegoconia quadripuncta*, Haw. (N); *Actenia brunnealis*, Tr. (N).

B. GENERALLY DISTRIBUTED SPECIES.

The following inhabit both the " Devonshire " orchards and the unrelieved desert:—*Agrotis ypsilon*, Rott., *Agrotis segetis*, Hbn., *Powellinia lasserrei*, Ob., *Triphaena pronuba*, L., *Scotogramma trifolii*, Rott., *Prodenia litura*, F., *Sideridis loreyi*, Dup., *Laphygma exigua*, Hbn., *Elaphria clavipalpis*, Scop., *Plusia gamma*, L., *Plusia ni*, Hbn., *Syngrapha circumflexa*, L., *Rhynchodontodes revolutalis*, Zell. (=*syria-*

*To the possible objection: " Why should they not have survived in the shade of the Euphrates poplar?" My reply is that this tree only grows naturally on islands and banks of the Euphrates and Tigris subject to annual flooding and that my observations of this sort of ground indicate that these particular species cannot survive such conditions.

calis, Stdgr. et auctorum),† *Macaria syriacaria*, Stgr., *Cornifrons ulceratalis*, Led., *Nomophila noctuella*, Schiff., *Plutella maculipennis*, Curt.

These species, whose adaptability is shown by their occurrence in the two extreme environments of the Mesopotamian plain (humid and arid) (not to mention the fact that many of them also occur in much colder climates), are naturally also to be found in such intermediate environments as 5 and 8.

C. SPECIES GENERALLY DISTRIBUTED EXCEPT IN THE DESERT.

This class is a very large one and the following list of names makes no attempt to be exhaustive. I omit those species specially attached to Euphrates poplar and tamarisk, for these two trees are typical of the river, and their fauna will be studied in "A Biological Study of a Tigris Island," and also because, though doubtless planted along the canals of similar gardens, the "Devonshire" orchards, where worked by me, contained none.

Species occurring in 4, 5, 6, and 8:—*Celama* sp., near *squalida*, Stgr., *Oenerogyia amanda*, Stgr., *Agrotis spinifera*, Hbn., **Haemassia vassilininei*, A. B.-H. (N), *Earias insulana*, Bsd., **Earias chlorophyllana*, Stgr. (N), *Acontia graellsi*, Fest., *Rivula sericealis*, Scop., **Thermesia arefacta*, Swinh., *Acantholipes regularis*, Hbn., *Sterrha ochroleucata*, H.S., **Tephrina perviaria*, Led. (N), *Pachyzanela* (*Psara*) *licarsisalis*, Walk., *Ercta ornatalis*, Dup., *Hypenodes balneorum*, Alph. (N).

D. DOUBTFUL.

Ophiuche masurialis, Guen. (N).

MORE DETAILED NOTES ON SOME OF THE ABOVE SPECIES.

O. amanda. I include this destructive insect in class C and not in class A because fig-trees are to be seen in several different types of environment in Iraq.

Rhyacia xanthographa. The genus *Rhyacia*'s Bagdad representation is still, unfortunately, rather a mystery to me, and I print the following note in the hope that the next entomologist to reside in that city in winter will clear it up. In February 1937 I found the larvae of two different species of *Rhyacia* feeding at night on grass below the palms and fruit-trees of "Devonshire." One of these I firmly expected to prove to be *Rhyacia rafidain*, Brsn., of which I took the unique holotype (♀) at the lights of the Alwiya Club, Bagdad, on 16.XI.35. The larvae, when mature, burrowed down deep into the earth of the tin in which I grew their foodplant (some four or five inches' depth), but there, perhaps because of the lack of a drainage hole at the tin's bottom, they all failed to pupate. The only imago representative of the genus that I came across in October and November 1937 on their breeding-ground was *xanthographa*. Both larvae were quite different from *xanthographa* larva as I know it in England, but M. Boursin has confirmed the iden-

†I am indebted to Herr O. Bang-Haas for the loan of the type enabling me to publish the synonymy.—E. P. W.

*These species were not taken in the "Devonshire" orchards, but in the Ramadi Road orchards, a drier, less shady locality, but they quite possibly inhabit "Devonshire."

tity of the imagines caught. The red form predominates, there being about two grey in every ten caught. It remains to be seen if there is a third species of this genus, as well as *rafidain*, awaiting discovery.

P. oleracea. Bred on 20.IV.38 from larvae found at night on 24.XI.37. A spring and an autumn brood.

Cirphis congrua (det. Boursin). Bred from a larva found with the *Rhyacia* larvae mentioned above; imago hatched 4.IV.37.

Sideridis ? putrescens. Hatched unnoticed during summer 1937 from a larva found with the preceding species; so spoilt itself that certain identification was impossible.

Haemassia vassilininei. Also at Ahwaz, 25.IX.38.

Acontia graellsi is regarded by the Iraqi Ministry of Agriculture as a cotton-pest.

Earias chlorophyllana. One specimen taken on the Ramadi Road, Bagdad, shows that this species' range overlaps with that of *irakana*. Its early stages not being known, one cannot yet be sure to which division of Iraq fauna it pertains, but it is probably only found where there is a certain amount of irrigation.

Thermesia arefacta. The larva feeds at night on *Prosopis stephaniana*. I think that this is the shrub to which Peile refers as *Acacia campbelli* (*loc. cit.*). It is the foodplant of quite a number of Iraqian Lepidoptera. The imago of *arefacta* is a day-flier from late August till October, and also is attracted to light sometimes. I have found it commonly among the rough dry herbage of the Ramadi Road orchards and also in the riverside scrub of the Kerkheh River, Khuzistan, S.W. Iran. It is of southern (Sindian) origin.

A. regularis. I have taken this species in Ahwaz, in the Kurdish or Persian hills (Rowanduz and Hamadan districts) and the " Devonshire " orchard (one, 22.II.36), but not in unrelieved desert.

H. balneorum. I have also taken this little moth, previously known from Turkestan, at Khanikin and Ahwaz.

O. (*Hypena*) *masurialis.* One specimen of this moth was taken at the lights of the Alwiya Club, 15.IV.36. Its ancestors may have reached Bagdad by following up the course of the Tigris northwards or perhaps by crossing Arabia during the Pluvial age.

Nychiodes ? divergaria. Small larvae of this genus were found in XI.37 in numbers at night on apricot trees. Unfortunately I was obliged to take them with me to Tabriz in December, where the winter was longer and severer than Bagdad's. None hibernated successfully. so I cannot be sure of the species' identity, but expect that it will prove to be *divergaria* which I have found not uncommonly in Kurdistan.

M. syriacaria. Food plant: *Prosopis stephaniana.* Many broods.

Ethmia pusiella. Food plant: *Asperugo procumbens*, in February and March. The imago flies in October and November. I also have an example from Ser Amadia (6000 ft.), a mountain in Iraqi Kurdistan not far from the Turkish frontier.

Obituary.—We regret to record the death of Comm. J. J. Walker, R.N., M.A., F.R.E.S., F.L.S., on 12th January. He was 87.

We also regret to record the death of Dr C. J. Gahan, M.A., late Keeper of the Department of Entomology at the British Museum. at the age of 77.